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REPRODUCTIVE ACTIVITY AND AGING IN THE MEDITERRANEAN FRUIT FLY, *CERATITIS CAPITATA* WIED.

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Abstract

Laboratory experiments with single pairs have been carried out in order to study the parental age effects on the adult progeny's longevity and reproduction of Ceratitis capitata Wied.

The results obtained with adults whose parents were 5,15 and 21 days old showed that,in general,the highest fecundity and fertility levels were observed in females originated from old parents. Males lived significantly more than females and the life span of males originated from old parents was higher than the one of males offspring from young parents. The considered populations did not differ significantly in the fecundity and fertility periods.

Conditions during the experiments were 26ºC ± 1ºC; 65% ± 5% RH and 12:12 hrs. L:D regime.

Introduction

Studies on the relationship between reproductive activity and aging in fruit flies species,usually conclude that the fecundity and fertility rates decrease as the adult age increases,and point out that the peak in eggs and larvae production is the most important time to study control measures.Nevertheless,a lack of extensive works is observed about the influence of parental age on the parameters definning the adult offspring reproduction along their life.

In a former study with Ceratitis capitata Wied.,which was presented to the XVII International Congress of Entomology (CEC/IOBC "ad-hoc meeting": Fruit Flies of Economic Importance) in Hamburg (FRG),1984,it was concluded that the weights of pupae obtained from crosses between old males and females were significantly higher than the ones estimated from the younger ones,irrespective of the pupal age and the larval density,except when the quantity of protein,Hansenula anomala,in the larval diet was reduced from 7% to 2% by weight. This result was obtained at a series of experimental conditions ranging from 19ºC to 28ºC and from 57% to 78% RH,with a fix light:dark regime of 12:12 hours. (Muñíz and Gil,1986).

Our proposal in this paper has been to obtain parameters of the reproductive activity of Ceratitis capitata Wied. for the three different parents' ages.

Material and methods

Isolated couples from a well adapted population of the Mediterranean fruit fly to the laboratory conditions,reared with a new larval diet that includes Hansenula anomala as protein source (Andrés and Muñiz, 1984; Muñiz and Andrés, 1983) were introduced in specially designed oviposition cages to study their reproductive activity (Muñiz, 1986).

Eggs were daily collected and percentages of hatching were observed in order to obtain fecundity and fertility data. Longevity of males and females were also checked. A Student's t-test was carried out with data of couples proceeding from three groups of parents (5,15 and 21 days old),in order to study the possible differences between two averages; 18 isolated couples were used for each parental age group.

Results and discussion

The fecundity patterns are presented in TABLE I. The three populations did not differ significantly in the preoviposition period,oviposition period, total eggs per female and daily eggs per female. However,a tendency to increase the total fecundity of females originated from old parents was observed,as well as a higher daily fecundity in females from 21 days old parents.

Similar effects were obtained for the fertility,whose results are showed in TABLE II.

On the other hand,life span was longer in males obtained from old than younger parents,and in all cases longer than in females (TABLE III).

These results contrast with the ones obtained by Tsiropoulos with Dacus oleae Gmel.,who found a significant decreasing in the adult progeny's fecundity rate (Tsiropoulos, 1984).

We consider that the results presented in this paper show the necessity

TABLE I. Fecundity of the Mediterranean fruit fly, Ceratitis capitata Wied. A: Adults originated from 5 days old parents. B: Adults originated from 15 days old parents. C: Adults originated from 21 days old parents. ($\bar{x} \pm$ S.E.)

T = 26ºC ± 1ºC; RH = 65% ± 5%; 12:12 hrs. L:D regime

Population	Preoviposition period (days)	Oviposition period(days)	Total eggs per female	Daily eggs per female
A	3,22 ± 0,55 (n=18)	25,78 ± 1,67 (n=18)	1622 ± 130 (n=18)	44,90 ± 4,50 (n=39)
B	3,00 ± 0,00 (n=17)	26,71 ± 1,50 (n=17)	1701 ± 95 (n=17)	43,87 ± 5,09 (n=41)
C	3,06 ± 0,24 (n=18)	25,39 ± 1,91 (n=18)	1731 ± 143 (n=18)	54,68 ± 4,69 (n=37)

TABLE II. Fertility of the Mediterranean fruit fly, Ceratitis capitata Wied. A: Adults originated from 5 days old parents. B: Adults originated from 15 days old parents. C: Adults originated from 21 days old parents. ($\bar{x} \pm$ S.E.)

T = 26ºC ± 1ºC; RH = 65% ± 5%; 12:12 L:D regime

Population	Fertility period(days)	Total larvae per female	Egg hatch (%)	Daily larvae per female
A	23,17 ± 1,63 (n=18)	981 ± 95 (n=18)	61,94 ± 4,82 (n=18)	26,54 ± 3,73 (n=39)
B	23,71 ± 1,59 (n=17)	1193 ± 84 (n=17)	71,30 ± 4,33 (n=17)	29,28 ± 4,26 (n=41)
C	22,94 ± 1,81 (n=18)	1083 ± 103 (n=18)	62,93 ± 3,12 (n=18)	33,06 ± 4,07 (n=37)

TABLE III. Longevity of the Mediterranean fruit fly, Ceratitis capitata Wied. A: Adults originated from 5 days old parents. B: Adults originated from 15 days old parents. C: Adults originated from 21 days old parents. ($\bar{x} \pm$ S.E.)

T = 26ºC ± 1ºC; RH = 65% ± 5%; 12:12 hrs. L:D regime

Population	Adult longevity	
	Males	Females
A	49,28 ± 6,23 (n = 18)	32,61 ± 1,75
B	60,82 ± 6,32 (n = 17)	35,88 ± 2,01
C	52,11 ± 3,90 (n = 18)	31,33 ± 3,04

to increase this kind of reśearch in order to acquire a better knowledge of the populations tails,to get reliable data on their reproductive activity and evaluate their incidence in the fruit damage. In this way,it will possible to apply control measures with a higher degree of efficiency.

References

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